

Repair of Injuries to Soft Tissues of Fingers

Primary and Secondary Reconstruction

RICHARD I. GONZALEZ, M.D., and HARRY J. BUNCKE, JR., M.D., San Mateo

THE GOAL OF TREATMENT of severely injured fingers is reconstruction of the finger to normal appearance and function. The authors have been helped in achieving this end, with minimal morbidity, by following principles which may not be generally accepted.

Over the past three years we have performed 346 reconstructive procedures in cases of acute and secondary soft tissue problems (Table 1). Two hundred thirty-one of the procedures were carried out in cases of acute injury, all of them complicated by crushing or avulsion of soft tissue; and in some of them there was tendon or bone damage as well. Simple, sharply incised wounds were not included in this series.

Submitted October 25, 1961.

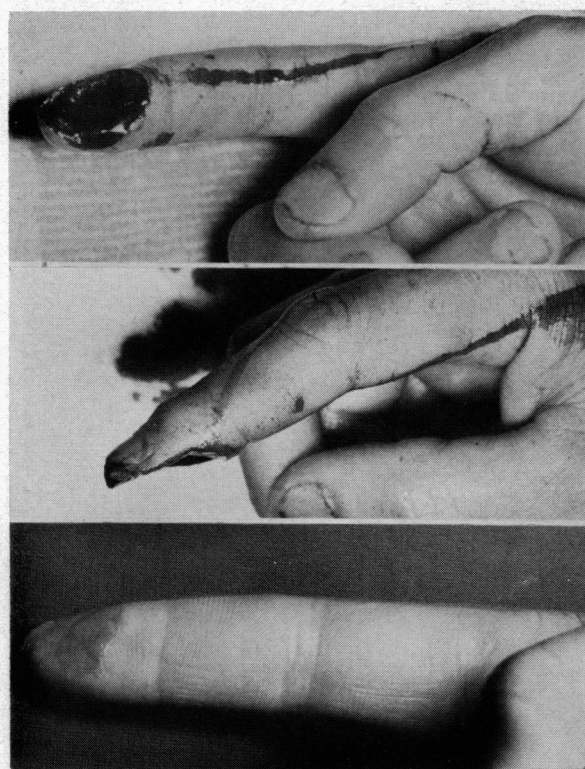


Figure 1.—Typical fresh, avulsive finger tip injury treated by primary split thickness skin graft producing an asymptomatic finger without loss of function. Secondary reconstruction not indicated.

• Preservation of maximum function and appearance of the finger can best be attained by wide excision of crushed or traumatized tissue and closure of defects by primary split thickness skin grafts. Primary pedicle flaps are rarely indicated and should be reserved for cover of denuded cortical bone or joint surfaces. In only 1 per cent of fresh injuries were primary pedicle flaps used. Finger length, nail bed and root, bone and tendon can be adequately preserved with minimal morbidity by split thickness skin grafts. Restoration of contour if necessary is best done secondarily, utilizing thenar or hypothenar flaps. These flaps are particularly indicated in the reconstruction of finger tips.

We are convinced that proper management of the acute injury is the most important factor in attaining the eventual optimum of appearance and function. Delayed healing, swelling or infection may result in secondary joint stiffness, tender amputation stumps or tender scars. Therefore, our whole concept of treatment of the acute injury turns upon primary healing. This we feel is best accomplished by wide debridement, closure of wounds without tension, liberal use of split-thickness grafts, adequate splinting and prevention of swelling.

Believing that restoration of contour or length should always be deferred, we feel that primary flaps are almost never justified. Flaps were used in only three instances in the treatment of the 231 cases. We believe that flaps are justifiable only if needed to provide covering for denuded proximal or middle phalanges or bare joint surfaces. In all other instances, split thickness grafts are by far the best for cover. Grafts take well on cancellous bone,

TABLE 1.—Data on Reconstructive Procedures for Repair of Injuries of Soft Tissue of Fingers

	Number	Per Cent of Total Number
Total number of procedures (1957-1960)	346
Primary reconstructive procedures	231	67
Delayed healing following primary treatment (3 weeks or longer)	11	5
Primary split thickness grafts	97	42
Primary pedicle flaps	3	1
Total secondary reconstructive procedures	115	33
Secondary procedure following primary care by us	41	17
Total secondary pedicle flaps	34	29

exposed tendon or joint capsule. Split grafts contract, mobilizing surrounding soft tissue and by so doing decrease the size of the defect (Figure 1). It is possible to maintain maximum finger length by the use of split thickness grafts and in many cases preserve nail root and portions of nail bed that are so important in achieving normal finger appearance (Figure 2).

Results of Primary Reconstruction. Split thickness grafts were used in 97 of 231 cases of primary reconstructions. There was delayed healing (three weeks or more) in 11 instances. Secondary reconstruction was indicated in 41 of the 231 cases.

Secondary Reconstructive Procedures. A total of 115 secondary reconstructive procedures were carried out. These included 81 simple excisions and

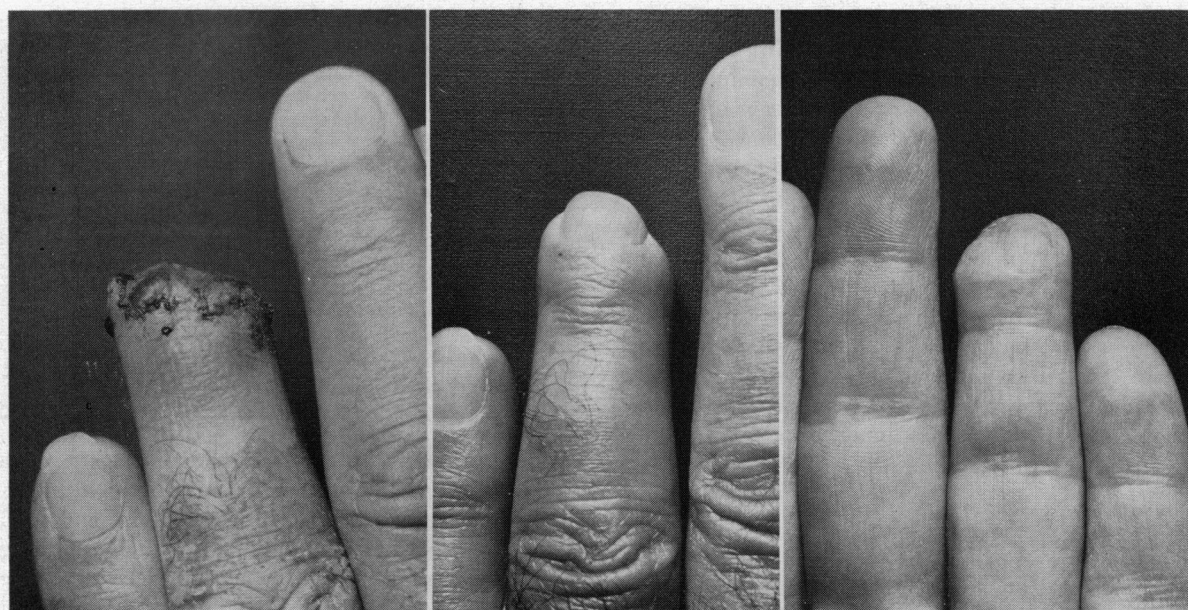


Figure 2.—Traumatic amputation of distal half of distal segment of ring finger treated by primary split graft demonstrating early healing and preservation of appearance and length by this method of treatment.



Figure 3.—Gangrene of the distal segment of thumb demonstrating the need for an emergency source of vascular tissue as provided by an abdominal pedicle flap with preservation of tendon, bone, joint and nail.

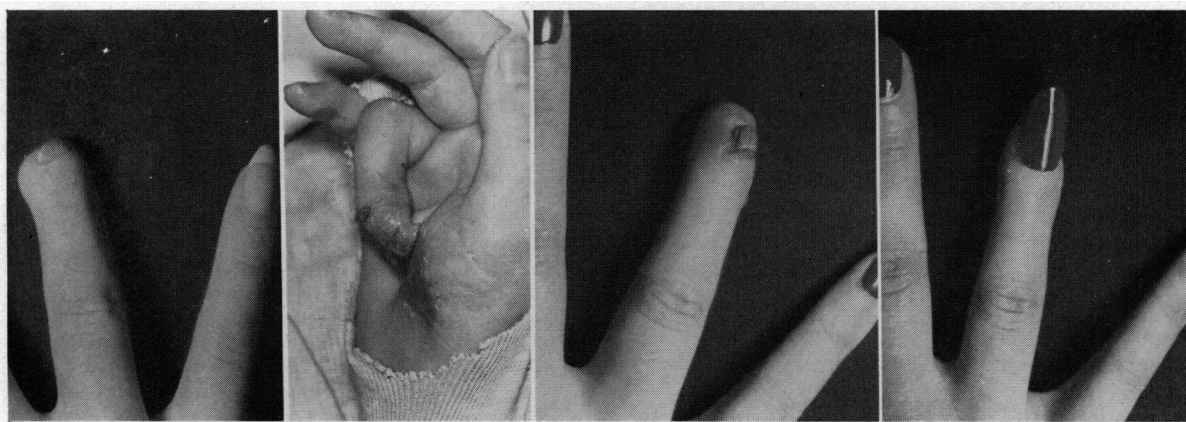


Figure 4.—Prosthetic method of nail reconstruction. Picture at far right shows nail in place, cemented to nail remnant and stabilized by encircling suture passed through a skin-lined finger pulp tunnel.

advancements and 34 cases in which pedicle flaps were used to restore contour and length. We preferred thenar or hypothenar flaps whenever possible. The advantages of proximal palmar tissue over dorsal finger skin or abdominal tissue is its anatomical similarity to volar finger skin (good color and texture match) availability of tissue and minimal residual deformity of the donor area. We find it very difficult to obliterate the exposed donor sites of cross finger flaps. Abdominal skin is so unlike finger skin that it is used only as an emergency source of vascular tissue (Figure 3). Morbidity following the use of flaps was limited to one instance of temporary mild flexion contracture of the middle joint following detachment of a thenar flap. No portions of flaps were lost. We did not detach the flaps before 21 days. Complete coverage of raw areas (flaps or donor sites) decreased superficial infection and minimizing swelling and secondary stiffness.

Nail reconstruction. Secondary fingernail reconstruction by standard methods (free nail grafts, toe to finger pedicle transfers) was disappointing. In a few instances we attempted to solve this problem by manufacturing a recipient site for a prosthetic nail. Figure 4 illustrates the use of a thenar flap to re-

store tip length and create a nail bed. A skin lined tunnel, through which a fixation suture could be passed, provided stability for the removable prosthetic nail.

Results Following Secondary Reconstruction. There were no instances of delayed healing (in excess of three weeks), permanent joint disability, residual tenderness or inadequate padding of finger tips. In cases not involving tendon and bone, there was no final limitation of extension or flexion. There were no complaints by patients regarding the multiple secondary reconstructive procedures recommended by us, nor dissatisfaction regarding the final result. Patients as a whole greatly appreciated our efforts to preserve the length and appearance of their injured fingers. The only expression of displeasure noted was regarding the absolute necessity of primary amputation of devitalized fingers. Not all fingers can be preserved, but the surgeon should resist the temptation of shortening fingers or amputating fingers merely to get the patient back to work. Split grafts will enable the patient to return to his job and will preserve the finger for secondary reconstruction.

104 St. Matthews Avenue, San Mateo (Gonzalez).

